PATENT
Attorney Docket No. 29610/CDT346

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Patent Application of: Nalinkumar L. Patel et al. Application No. 10/531,070 Filed: October 10, 2003 (Int'l Application No. PCT/GB2003/004406) For: Optical Device Confirmation No.: 2522 Art Unit: 1715 Examiner: James Lin	I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being transmitted via the Office electronic filing system in accordance with §1.6(a)(4). February 1, 2011 /Andrew M. Lawrence/ Andrew M. Lawrence, Reg. No. 46,130 Attorney for Appellants

APPELLANTS' REPLY TO EXAMINER'S ANSWER

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

INTRODUCTORY COMMENTS

This paper is submitted in response to the Examiner's Answer dated December 1, 2010 in connection with the above-identified application.

REMARKS

Claims 1-3 and 6-24 stand rejected under 35 USC § 103(a) as assertedly obvious over Aziz in view of Lee 1 and/or Lee 2, and optionally further in view of Towns, Hirai, and Roach.

In order to purportedly arrive at the claimed invention, the combination of references proposed by the Examiner has to include heating an optical device at or below (or simply "below" as recited in claims 19-24) the glass transition temperature of the polyfluorene / organic semiconducting layer both *before and after* forming a second electrode over the polyfluorene / organic semiconducting layer.

In this respect, the Examiner asserted that "the combined teachings of Aziz, Lee 1 and Lee 2 would have reasonably suggested a spin coating step, a baking step below T_g, a pre-annealing step above T_g and a post-annealing step below T_g," thereby arriving at the claimed invention. *See* Examiner's Answer at page 7.[1] Thus, the Examiner conceded that if Aziz were modified in view of Lee 1 and/or Lee 2, then Aziz would be modified to include "at least one annealing step at a temperature above T_g." *Id.* As explained in further detail below, the appellants respectfully submit, however, that if one of ordinary skill in the art were to modify Aziz in view of Lee 1 and/or Lee 2, then a single post-annealing step would be conducted at a temperature above the glass transition temperature (which is not in accordance with the claimed invention).

A. If one of ordinary skill in the art were to modify Aziz in view of Lee 1 and/or Lee 2, then a single post-annealing step would be conducted at a temperature above T_g

Aziz discloses heating the "*as-fabricated* organic light emitting device" (i.e., post-deposition of the cathode) at an "annealing temperature that is below the melting temperature of the material forming the light emission region." *See* Aziz at paragraph 0085. An annealing temperature below the glass transition temperature of the light-emissive region is suggested as a preferred embodiment in Aziz, but temperatures above the glass transition temperature (and below the melting temperature) are possible. *See* Aziz at paragraph 0085. Aziz does not teach or suggest heating the organic light-emitting material at any temperature *before* forming the second electrode, however, much less at a temperature at or below the glass transition temperature, as claimed. In view of this deficiency, the examiner turned to the teachings of Lee 1 and Lee 2.

Lee 1 and Lee 2 both teach baking a light-emitting polymer film at a temperature below the polymer glass transition temperature before depositing the second electrode in order to remove residual solvent. *See* Lee 1 at page 250, column 2; *see also* Lee 2 at page 801, column 2. After the baking step, Lee 1 and Lee 2 both disclose annealing above the glass transition temperature before and/or after forming the second electrode. Lee 1 and Lee 2 both further teach that conducting *only post-deposition annealing* above the glass transition temperature in conjunction with the baking step

[1] For this paper, the appellants have adopted the Examiner's nomenclature for baking, pre-annealing, and post-annealing as explained at page 6 of the Examiner's answer.

provides the most efficient EL device. *See* Lee 1 at page 251, column 2; *see also* Lee 2 at page 803, column 2. In view of these teachings that post-deposition annealing above the glass transition temperature provides the most efficient EL device, one of ordinary skill would also logically be motivated to conduct the post-annealing step of Aziz at a temperature above the glass transition temperature, as explicitly contemplated by Aziz paragraph 0085, if any modification of Aziz was made in view of Lee 1 and/or Lee 2.

Such a modification, however, does not allow the proposed combination to arrive at the claimed subject matter. And this is why the Examiner now urges that Aziz teaches away from a post-annealing step at a temperature above the glass transition temperature ("Aziz would have taught away from the use of the post-annealing step of Lee 1 and Lee 2." *See* Examiner's Answer at page 7.), but apparently not from a pre-annealing step at a temperature above the glass transition temperature which the Examiner asserted is included in the combined teachings. The assertion that Aziz teaches away from a post-annealing step at a temperature above the glass transition temperature is unfounded because:

(i) Aziz only discloses a post-annealing step;

(ii) Aziz explicitly contemplates conducting the post-annealing step at temperatures greater than T_g; and

(iii) moreover, both Lee 1 and Lee 2 unequivocally disclose that conducting *only post-deposition annealing* above the glass transition temperature in conjunction with the baking step provides the most efficient EL device. *See* Lee 1 at abstract and page 251, column 2; *see also* Lee 2 at page 803, column 2.

Thus, the most logical modification of Aziz in view of Lee 1 and/or Lee 2 would be to include a single post-annealing step at a temperature above the glass transition temperature. The failure to modify Aziz in the most logical fashion is inexplicable. *See* W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 1552 (finding improper the failure to explain "what there was in the prior art that would have caused those skilled in the art to disregard the teachings there found").

In view of the foregoing, the appellants respectfully submit that the combination of Aziz with Lee 1 and Lee 2, if made, would motivate one skilled in the art to include a baking step and a single post-annealing step at a temperature above the glass transition temperature. Thus, the logical modification of Aziz in view of Lee 1 and/or Lee 2, if such modification was made by one of ordinary skill in the art, does not support a rejection under § 103(a).

B. To the extent that Aziz teaches away from a post-annealing step above the glass transition temperature as urged by the Examiner, it must also teach away from a pre-annealing step above the glass transition temperature

The appellants acknowledge that Aziz teaches that "[t]he annealing temperature is preferably also selected to avoid any substantial structural changes of the organic light emitting devices as a result of the annealing." *See* Aziz at paragraph 0086. To the extent that this teaching in Aziz teaches

away from a post-annealing step above the glass transition temperature as urged by the Examiner, the appellants respectfully submit that it must also teach away from a pre-annealing step above the glass transition temperature. Consequently, if the Examiner's interpretation is honored, the proposed combination of Aziz with either Lee 1 and/or Lee 2 would not be made at all as Aziz would teach away from such modification.

It is worth restating that the Examiner asserted that "the combined teachings of Aziz, Lee 1 and Lee 2 would have reasonably suggested a spin coating step, a baking step below T_g, a pre-annealing step above T_g and a post-annealing step below T_g." *See* Examiner's Answer at page 7. Thus, the Examiner considers the proposed combined teachings to include a pre-annealing step above the glass transition temperature.

Lee 1 and Lee 2 teach that such a pre-annealing step above the glass transition temperature before cathode deposition "is expected to change the polymer morphology dominantly" and "changes the morphology within the polymer film," respectively. *See* Lee 1 at page 250, column 2; *see also* Lee 2 at page 801, column 2. Indeed, the Examiner acknowledged that "[t]he annealing steps of Lee 1 and Lee 2 changes (sic) the polymer morphology, which would create a substantial change of the structure." *See* Examiner's Answer at page 7.

The appellants respectfully submit that modifying Aziz to include a pre-annealing step above the glass transition temperature as disclosed in Lee 1 and Lee 2 is inconsistent with the Examiner's acknowledgement that the morphology of the polymer film is substantially changed by such a step, particularly in view of the Examiner's indication that the teaching in Aziz to (preferably) avoid substantial structural changes constitutes a teaching away from a post-annealing step. Consequently, if the Examiner's interpretation is to be honored, Aziz must also teach away from performing an annealing step above the glass transition temperature as disclosed in Lee 1 and Lee 2 when the annealing step is conducted before cathode deposition. Thus, if the Examiner's interpretation was applied consistently, the proposed modification would not be made as a matter of law.

In this respect, the appellants respectfully submit that a consistent interpretation of Aziz in view of Lee 1 and/or Lee 2 should be maintained, and that picking and choosing from the references as the Examiner has done is based upon hindsight reconstruction and is impermissible. *See* In re Fine, 837 F.2d 1071 (Fed. Cir. 1988); *see also* In re Fritch, 972 F.2d 1260 (Fed. Cir. 1992).

C. Final Remarks

Heating the device at a temperature at or below the glass transition temperature of the organic semiconducting material *both before and after* forming the second electrode, as claimed, improves the lifetime of the optical device relative to a single heat treatment alone (whether conducted before or after forming the second electrode). *See* the Application at p. 5, fourth paragraph and Figure 2 (comparing the comparative examples to the device of example 1). Because the cited documents fail to disclose or suggest methods of forming an optical device comprising heating an optical device at or below (much less simply "below" as recited in claims 19-24) the glass transition

temperature of the polyfluorene / organic semiconducting layer both *before and after* forming a second electrode over the polyfluorene / organic semiconducting layer, or the benefits associated with such methods, a *prima facie* case of obviousness cannot be maintained.

Further modification of the proposed combination with any of Towns, Hirai or Roach does not cure the aforementioned deficiencies.

D. Conclusion

The outstanding claim rejections should be removed. Allowance of all pending claims is respectfully requested.

Respectfully submitted,

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February 1, 2011

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